



Pulmonary Hypertension

DETECTION OF PULMONARY ARTERIAL HYPERTENSION AND VENTRICULAR INTERACTION BY DIGITAL ACOUSTIC PHONOCARDIOGRAPHY

ACC Moderated Poster Contributions
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Session Title: Highlighting Right Ventricular Structure, Function, and Physiology in Pulmonary Hypertension

Abstract Category: 30. Pulmonary Hypertension

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Background: Understanding the relationship between phonocardiographic measurements and cardiac structure and hemodynamics may be useful to assess patients with suspected pulmonary arterial hypertension (PH).

Methods: Prospective observational study of 40 patients undergoing right heart catheterization (RHC) and 2D echocardiography for evaluation of PH. Phonocardiographic recordings (Audiocor, Inovise Medical) were obtained within 2 hours of RHC.

Results: Mean age of the cohort was 58 ± 16 years, 78% female. The predominant etiology of PH was idiopathic (30%) or PH associated with connective tissue diseases (53%). Mean pulmonary arterial pressure (PAP) was 40 ± 13 mmHg (range 23 to 55 mmHg) and mean pulmonary capillary wedge pressure was 8 ± 4 mmHg. Normal left ventricular function was confirmed in all patients by echocardiography. The ratio of acoustic complexity between the 2nd and 1st heart sounds in (S2/S1 complexity) correlated with both mean PAP ($r=0.61$, $p<0.0001$ and $r=0.46$, $p=0.003$, respectively) and pulmonary vascular resistance ($r=0.49$, $p=0.002$ and $r=0.36$, $p=0.03$, respectively). S1 complexity best predicted the absence of PH (OR 0.24, 95% CI 0.07-0.86, $p=0.03$) with an area-under-curve (AUC) of the receiver-operating characteristic curve of 0.97 (95% CI 0.91-1.03, $p=0.002$). Decreased S1 complexity also predicted moderate-severe RV enlargement (AUC 0.72, 95% CI 0.56-0.88, $p=0.02$) and systolic dysfunction (AUC 0.74, 0.58-0.90, $p=0.01$). Increased S2 complexity independently predicted moderate-severe RV dysfunction with AUC 0.79 (0.65-0.93, $p=0.002$).

Conclusions: Phonocardiographic characteristics of S1 and S2 are related to the severity of PH and associated RV dysfunction. RV enlargement and dysfunction results in increasing S2 complexity and decreasing S1 complexity. The reciprocal relationship between S2 and S1 complexity may reflect ventricular interaction associated with PH.